

1 Claims

3 1. Optical module having

- 4 - a circuit carrier (10);
- 5 - a housed semiconductor element (12) arranged on the
- 6 circuit carrier (10); and
- 7 - a lens unit (14; 16, 18, 20; 21) for projecting
- 8 electromagnetic radiation onto the semiconductor
- 9 element (12);

10 characterized in that

- 11 - the lens unit comprises an area (14), supporting the
- 12 lenses (16, 18, 20; 21), that is an integral
- 13 component of the housing (13) of the semiconductor
- 14 element (12).

16 2. Optical module according to claim 1,

17 characterized in that

18 the area (14) supporting the lenses (16, 18, 20; 21) is
19 preferably formed in one piece with the housing (13),
20 preferably from a thermosetting plastic material.

22 3. Optical module according to claim 1,

23 characterized in that

24 the area (14) supporting the lenses (16, 18, 20; 21) is
25 preferably formed on the housing (13), for instance in a
26 two-component injection process.

28 4. Optical module according to claim 3,

29 characterized in that

30 the area (14) supporting the lenses (16, 18, 20; 21)
31 contains thermoplastic material and the housing (13)
32 contains thermosetting material.

5. Optical module according to one of the preceding claims, characterized in that the lens unit (14; 16, 18, 20; 21) comprises a plurality of lenses in the form of a package, the lenses (16, 18, 20) and where appropriate at least one diaphragm (21) being preferably in direct contact with one another, and the relative positions of the lenses (16, 18, 20) and where appropriate the diaphragm (21) to one another being preferably defined by the geometry of the lenses and/or diaphragm themselves.

6. Optical module according to one of the claims 1 to 5, characterized in that just one (20) of the lenses (16, 18, 20; 21) is in direct contact with the lens holder (14), preferably in a watertight and dustproof manner, the methods for attaching the exactly one lens (20) to the lens holder (14) including preferably ultrasound, laser soldering and/or adhesives.

7. Optical module according to one of the claims 1 to 5, characterized in that the lenses (16, 18, 20; 21) are snapped into the lens holder (14) by a means of latching (32), the lenses (16, 18, 20) or diaphragm (21) preferably having a hard and a soft component for the purpose of forming a watertight and dustproof seal, with the soft component being arranged as a seal in the area of the lenses (16, 18, 20; 21).

8. Optical module according to one of the claims 1 to 5, characterized in that

1 the lenses (16, 18, 20; 21) are attached in the area (14)
2 supporting the lenses, within the chip housing (13), by
3 means of a retaining element, said retaining element
4 preferably having a hard and a permanently elastic
5 component formed on the area supporting the lens (20) for
6 the purpose of forming a seal and compensating for
7 stress, and said retaining element being joined to its
8 hard component by ultrasound, laser soldering and/or
9 adhesive or riveting methods, or by means of a snap or
10 screw connection to the area (14) supporting the lenses
11 (16, 18, 20, 21).
12

13 9. Optical module according to one of the preceding claims,
14 characterized in that
15 pigments are applied to the area (14) supporting the
16 lenses (16, 18, 20; 21), giving rise to a black and/or
17 dull or totally reflective finish, by which means
18 unwanted optical effects, in particular those due to the
19 lateral incidence of light, are prevented.
20

21 10. Optical system having an optical module according to one
22 of the preceding claims.
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